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HERBERT ARKIN
Professor Emeritus

March 10, 1982

Mr. H. Thomas Austern
Covington & Burling
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P.O. Box 7566
Washington, D.C. 20044

Dear Mr. Austern:

As requested, I have examined the date records consisting of laboratory determination calculation sheets and statistical summary sheets which you represented to me to be copies of the original laboratory data sheets compiled by the Federal Trade Commission and used as the basis for figures on "tar" TPM (Dry) and nicotine yields of various brands of cigarettes as well as the final reports on these data released by the Federal Trade Commission.

It was the laboratory data sheets for the "tar" and nicotine figures released by the Federal Trade Commission under the date December 1981 which I examined and upon which I report in this letter.

PM3001060612

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

The number of brands tested in the current report rose to 200 as compared with 187 in the prior report.

The data handling care in the FTC laboratory in this set of data (Test No. 24)[1] declined as compared with that for the prior test (Test No. 23).

The number of calculational errors increased to 25. There was a tremendous increase in impossible figures to a total of 107. Further, there were 11 instances of incorrect posting to the summary sheets and 1 instance not posted to the summary sheets from the laboratory sheets. In addition there were 6 errors in posting CO figures from the computer sheets to the lab sheets.

The number of deletions of determinations fell sharply but remained high with 14.2% of the determinations deleted. The number of deletions excluding "deleted days" fell from 470 for Test No. 23 to 235 for the current test (No. 24).

In the last report, it was noted that the carbon monoxide values produced by the FTC laboratory averaged about 12% higher than the equivalent values obtained by the Tobacco Industry laboratory.

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1. The prior tests performed by the FTC laboratory were dated November 20, 1967-No. 1; June 11, 1968-No. 2; October 10, 1968-No. 3; February 27, 1969-No. 4; July 9, 1969-No. 5; November 19, 1969-No. 6; May 18, 1970-No. 7; October 21, 1970-No. 8; August 1971-No. 9; March 1972-No. 10; August 1972-No. 11; February 22 1973-No. 12; September 18, 1973-No. 13; March 1974-No. 14; September 1974-No. 15; March 1975-No. 16; September 1975-No. 17; April 1976-No. 18; November 1976-No. 19; August 1977-No. 20; May 1978-No. 21; December 1979-No. 22; March 1981-No. 23.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Since the last report (March 1981) the FTC has published a revised list of carbon monoxide measurements for the brands in the Federal Register blaming the difference on a computer programming error. The carbon monoxide levels for the brands are now on the average 3.2% lower than those of the Tobacco Industry laboratory. This shift is discussed in detail later in this report.

There continues to be evidence of variations resulting in wide swings in the daily levels of the reported data in spite of large scale deletions of all determinations for entire days. The phenomena are similar to those reported in my prior letters.

A. CARBON MONOXIDE MEASUREMENTS

In my previous report dated August 3, 1981 relative to Test No. 23, it was noted that the average carbon monoxide measurement by the Federal Trade Commission for brands tested was 11.7% higher than that of the Tobacco Industry laboratory. On August 14, 1981 there appeared in the Federal Register a notice by the Federal Trade Commission revising the previously published brand carbon monoxide measurements.

The reason given for the change was a computer programming error. It was stated that "the correct recalculated figures are included in the table which follows. Each of these figures is precisely 8 percent less than the figures previously reported."

The overall carbon monoxide average for the current test (Test No. 24) exhibits a further decline in the Federal Trade measurements to the point where that average is now lower than the average of the same brands resulting from the Tobacco Industry laboratory tests.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Carbon Monoxide Measurements
by Federal Trade Commission and
Tobacco Industry Laboratory
For the Same Brands
As of March and December 1981
(Tests #23 and #24)

	Average CO (mgms) FTC	TITI
Original - March 81	13.8	12.3
Revised - March *81	12.7	12.3
December 1981	11.1	11.5

*In accordance with the information supplied by the Federal Trade Commission in the Federal Register dated August 14, 1981, the original average was reduced by 8%.

Further evidence of such a decline may be seen from the fact that about two thirds of the brands which the Federal Trade Commission tested and reported on in both periods had carbon monoxide averages which were lower in the December test than in the March tests, after allowing for the 8% revision and eliminating brands reported by the FTC as reformulated in the March report.

It may be noted that even after eliminating the brands reported as reformulated, and the 8% revision in the March data there were 26 brands for which the CO measurement differed by one or more mgms between the two tests with some disparities exceeding 4 mgms.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Once again, the disparity between the FTC and TITL results is greatest, both in the absolute and relative sense, at low carbon monoxide levels.

Carbon Monoxide Measurements
by Federal Trade Commission and
Tobacco Industry Laboratory
For the Same Brands
Report Dated December 1981

CO* Measurement mgm	Average CO (mgm) FTC	TITL	Percent** Difference	Number of Brands
0 - 9	5.26	5.66	7.0%	70
10 - 14	12.21	12.56	2.8%	62
15 - 25	16.54	16.90	2.1%	64
Overall	11.14	11.51	3.2%	196

*As measured by FTC
**As a percent of the TITL average

I have previously reported on the correlation between the TPM measurements and the CO values. Evidence of this relationship continues, as well as the peculiarity that unlike brands with low TPM (dry), the high TPM brands (over 21 mgms) showed CO averages less than the TPM averages.

TPM (dry) and Carbon Monoxide Values
for 190 Brands of Cigarettes
as Reported in the FTC Report
Dated December 1981

TPM (dry) Level (mgms)	Average TPM (dry) mgms	Average Carbon Monoxide mgms	Number of Brands
0 - 20	10.6	11.1	176
21 and over	24.5	15.8	14
Overall	11.6	11.5	190

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

B. CALCULATIONAL AND POSTING ERRORS

Once again the level of calculational errors has increased over that of the previous test to a total of 25 and the highest level since October 1970. (See Appendix I for details)

Number of Calculational Errors*
"Tar", Nicotine and Carbon Monoxide Determinations
Federal Trade Commission
Laboratory Sheets

Date of Report	Brand Cigarettes	Monitor Cigarettes	Total
October 10, 1968	65	**	
February 27, 1969	73	**	
July 9, 1969	42	**	
November 19, 1969	43	20	63
May 18, 1970	60	15	75
October 21, 1970	5	0	5
August 1971	4	18	22
March 1972	2	1	3
August 1972	4	4	8
February 22, 1973	12	3	15
September 1973	23	1	24
March 1974	2	1	3
September 1974	4	2	6
March 1975	6	4	10
September 1975	1	1	2
April 1976	0	0	0
November 1976	8	1	9
August 1977	6	5	11
May 1978	6	1	7
December 1979	7	1	8
March 1981	12	4	16
December 1981	22	3	25

*Calculational differences were counted only if the error was at least 0.2 mgms for TPM (Dry) and 0.02 for nicotine. The individual errors are listed in Appendix I.

**Not counted for these reports.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

In addition, there was an error in footing on the summary sheet for Galaxy F. SP., 85mm. This error changed the average carbon monoxide for that cigarette to 14.4 mgms rather than 13.4. The FTC reported average is incorrect for that cigarette.

There were a total of 11 errors in posting from the laboratory sheets to the summary sheets, 10 for the monitor cigarettes and one for a brand. In addition, there were 6 errors in posting from the computer sheets to the laboratory sheets, one resulting in a change in the CO value for Marlboro Lights, F. SP, 85mm from 12.4 to 12.1 mgms. The figure included in the FTC report for December is incorrect. These posting errors are detailed in Appendix II.

A more serious problem has become evident for low tar cigarettes with the use of the new smoking machine. There were 107 cases in which the TPM (wet) and/or TPM (dry) were calculated to be negative figures as compared with 7 in the last test (#23). (See Appendix III) This of course is impossible, but nevertheless these values were posted to the summary sheets as negative values. Thus, in computing the averages for a brand the values were totalled considering the negative figures incorrectly as values to be subtracted. The result is that these impossible values serve to reduce the brand average improperly.

This practice results in figures of dubious meaning and value. In my opinion, whenever an impossible figure arises, such as negative TPM values, they should simply be discarded and not used in any computation.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

At this time, the practice at the FTC laboratory seems to be to report all TPM or CO figures of less than 1 mgm as **. However, in the summaries these figures are often rounded off to zero. This can cause difficulties and can result in negative values at times. It is suggested that they be carried as their true value using an additional decimal if required.

With the increasing number of low TPM cigarettes, the measurement of TPM and CO in the very low range has been and will be an increasing problem. It is suggested that it might be wise to consider methods of dealing with this problem. The low value figures produced for some cigarettes by FTC are of very questionable meaning.

C. DISCARDS

In my prior analysis it was noted that a considerable amount of data on the laboratory sheets were discarded by merely stamping the column for the determination "deleted". It was observed that the result of such a practice is to falsely give an impression of greater uniformity of test results than actually exists in practice.

In the last test (#23), a tremendous increase in the number of discards, reaching a new record, was observed. The records for this report (#24, December 1981) indicate a very considerable decline in this practice although still well above the average for the past. There were 869 discarded determinations, 201 for monitor cigarettes and 668 for brand cigarette determinations.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Nicotine and TPM Determinations
Discarded in Tests 5 Through 24

Test Number	Monitor Cigarettes	Brand Cigarettes	Total
5	77	62	139
6	19	72	91
7	94	272	366
8	17	76	93
9	158	232	390
10	436	235	671
11	333	193	526
12	263	231	494
13	165	216	381(a)
14	283	163	446
15	202	533	735
16	106	294	400(b)
17	296	815	1111(c)
18	117	359	476(d)
19	156	581	737(e)
20	221	746	967(f)
21	163	587	750(g)
22	212	982	1194(h)
23	650	1934	2584(i)
24	201	668	869(j)

(a) Includes 14 deletions on summary sheets not on lab sheets.

(b) Includes 186 deletions where it was indicated that all data for that day was deleted (stamped deleted day) and 2 instances where deletions were made on the summary sheets but not the lab sheets.

(c) Includes 896 deletions where it was indicated that all data for that day was deleted and 2 instances where deletions were made on summary sheets but not lab sheets.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

(d) Includes 297 deletions where it was indicated that all data for that day was deleted and 2 instances where deletions were made on summary sheets but not on lab sheets.

(e) Includes 439 deletions where it was indicated that all data for that day were deleted.

(f) Includes 787 deletions where it was indicated that all data for that day were deleted.

(g) Includes 292 deletions where it was indicated that all data for that day were deleted and 7 instances where deletions were made on the summary sheets but not on lab sheets.

(h) Includes 700 deletions where it was indicated that all data for that day were deleted and 5 deletions were made on the summary sheets but not indicated on the lab sheets.

(i) Includes 2114 deletions where it was indicated that all data for that day were deleted and 20 deletions were made on the summary sheets but not indicated on the lab sheets.

(j) Includes 634 deletions where it was indicated that all data for that day were deleted and 24 deletions were made on the summary sheets but not indicated on the lab sheets.

The 869 deletions constituted 14.2% of all determinations. Thus 1 in every 7 determinations noted on the laboratory sheets were ultimately discarded.

D. VARIATIONS IN TEST LEVELS

As in the past, the FTC laboratory has included control (monitor) cigarettes in each smoking runs for brand tests. These cigarettes are samples of a larger homogeneous group of cigarettes manufactured for this purpose.

Previous tests have shown wide variability in the TPM and nicotine determinations for both day to day variation and period to period variation.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

This test provides an opportunity to examine the variations over time in carbon monoxide determinations for samples of monitor cigarettes.

The variation in carbon monoxide measurements for this group of relatively homogeneous cigarettes from day to day was even wider than that for TPM (dry). The range of CO measurements for the monitor cigarettes was from a high of 19.4 mgms to a low of 16.1 mgms. For the same cigarettes the TPM (dry) range was from 17.4 mgms to a low of 15.6 mgms.

While there was not a close association in the variations from day to day, there were similarities indicating a general association between variations in TPM (dry) and carbon monoxide values. For both sets of measurements, the average daily values were higher for the period June 24 to July 22, 1981 than for the later period.

Monitor Cigarettes
Carbon Monoxide and TPM (dry)
Measurements
June 24 - July 22 vs. Rest of Period
FTC Laboratory

Period	Carbon Monoxide Average (mgms)	TPM (dry) Average
June 24 - July 22	18.69	16.73
July 23 - Oct 28	17.02	16.33

A similar situation did not exist for the nicotine measurements for the monitor cigarettes.

Further, it is to be noted that the lowest daily average for both carbon monoxide and TPM (dry) measurements were acheived on August 3, 1981.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Monitor Cigarettes
Carbon Monoxide and TPM (dry)
Measurements
August 3, 1981
FTC Laboratory

Period	Average Carbon Monoxide	Average TPM Dry
August 3, 1981	16.1	15.6
Overall Average	17.5*	16.5*

*Excluding August 3

The highest daily averages were found to be July 13 for carbon monoxide and July 10 for TPM (dry). It is to be noted that July 13 was the next working day after July 10. The CO average for July 13 was 19.4 with the overall average of 17.5 and for TPM (dry) the July 10 value was 17.4 compared with the overall average for monitor cigarettes of 16.5.

These fluctuations are confirmed by similar variations in the brand tests for carbon monoxide.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

A statistically significant shift in brand test averages accompanying a shift in the level of carbon monoxide can be seen below:

Carbon Monoxide Determinations
Monitor and Brand Cigarettes
For Two Periods
FTC Laboratory Data

Period	Monitor Cigarettes Average Carbon Monoxide (mgms)	Brand Cigarettes Number Above Average*	Brand Cigarettes Number Below Average*
June 24, 1981 - August 31	17.8	127	69
September 1 - October 28	16.6		

*Above or below average for other period. This difference is statistically significant. There was one brand with identical averages for both periods. It was not included in the above table.

This general association of level shifts between TPM and carbon monoxide values might indicate some common experimental factor, perhaps of an enviromental nature. Further examination and analysis may possibly disclose this factor and the possible general reduction in the variability of the testing method.

F. ROUNDING ERRORS

The rounding error problem has increased with a total of 20 errors in this FTC report as compared with 11 in the March 1981 report. These errors are listed in Appendix IV.

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

It will be recalled that the apparent rounding method was to round up the TPM average if it was 5 or more in the tenths of a mgm position and down if less. In similar fashion the nicotine average would be rounded up if there was a 5 or more in the hundreths position. Carbon monoxide averages would be handled in the same manner as that for TPM.

Sincerely,

Herbert Arkin

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix I

Federal Trade Commission

TPM, Nicotine and Carbon Monoxide Measurements

Data Dated December 1981

Calculational Errors on Laboratory Sheets

Date	Cigarette No.	Run	Port	TPM (Dry) Original	TPM (Dry) Corrected	Nicotine Original	Nicotine Corrected	See Notes*
				BRAND CIGARETTES				
6/29/81	46	4	2	24.3	24.5	1.79	1.64	1
7/01/81	172	5	14	3.9	4.4			2
7/06/81	76	3	1	15.6	15.4			3
7/09/81	152	3	20	3.4	3.8			4
7/10/81	66	4	17	3.6	4.1			5
7/13/81	174	2	10	.7	.4			6
7/16/81	189	1	16	7.2	7.7			7
7/24/81	133	5	3	13.1	12.3			8
7/24/81	24	5	4	2.5	3.2			9
8/20/81	189	4	8	7.1	7.7			10
8/20/81	137	1	18	19.2	20.3	1.71	1.55	11
8/21/81	66	3	4	5.2	5.0			12
9/08/81	37	4	7	22.8	23.2			13
9/14/81	25	4	15			1.48	1.42	14
9/14/81	126	2	10	9.5	9.1			15
9/16/81	193	3	4	3.4	4.2			16
9/16/81	153	3	5	16.0	15.3			17
9/18/81	134	5	4	9.5	10.2			18
9/18/81	130	4	11	5.9	6.3			19
9/18/81	140	4	10	15.0	14.7			20
9/18/81	106	2	18	9.8	10.7			21
9/08/81	174	3	8	1.6	1.0			22

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

MONITOR CIGARETTES

Date	Cigarette No.	Run	Port	TPM (Dry) Original	TPM (Dry) Corrected	Nicotine Original	Nicotine Corrected	See Notes*
8/07/81	17M	4	9	17.0	16.4			23
8/31/81	17M	4	19	15.3	15.7			24
9/16/81	17M	1	15	16.5	17.0			25

*NOTES:

1. Nicotine Calculation: $\frac{1.059\ (.794 - \frac{1}{2}\ (.345 + .181))\ x\ 500}{34.3\ (5)}$ = 1.64 not 1.79

   Therefore, TPM (Dry) = 28.0 - 1.91 - 1.64 = 24.5 not 24.3

2. TPM (Dry) Calculation: 5.4 - .62 - .42 = 4.4 not 3.9

3. TPM (Wet) Calculation: $\frac{(33.3421 - 33.2520)\ x\ 1000}{5}$ = 18.0 not 18.2

   Therefore, TPM (Dry) = 18.0 - 1.65 - .99 = 15.4 not 15.6

4. TPM (Dry) Calculation: 4.2 - (-.02) - .40 = 3.8 not 3.4

5. TPM (Dry) Calculation: 5.2 - .60 - .48 = 4.1 not 3.6

6. Water Calculation: $\frac{(98 \div 5899) + .0134}{.0173\ (5)}$ = .35 not .04

   Therefore, TPM (Dry) = .9 - .35 - .16 = .4 not .7

7. TPM (Dry) Calculation: 9.0 - .67 - .59 = 7.7 not 7.2

8. TPM (Dry) Calculation: 15.9 - 2.51 - 1.08 = 12.3 not 13.1

   NOTE: Deleted on lab sheet but not on summary.

9. TPM (Dry) Calculation: 3.9 - .35 - .33 = 3.2 not 2.5

10. TPM (Dry) Calculation: 8.8 - .45 - .63 = 7.7 not 7.1

11. Water Calculation: $\frac{(2493 \div 7962) + (-.0310)}{(.0147)(5)}$ = 3.84 not 4.82

    Nicotine: = $\frac{1.059\ (.776 - \frac{1}{2}\ (.356 + .189))\ x\ 500}{34.3\ (5)}$ = 1.55 not 1.71

    Therefore, TPM (Dry) = 25.7 - 3.84 - 1.55 = 20.3 not 19.2

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix I - (Con't)

*NOTES:

12. Water Calculation: $\frac{(541 \div 7978) + (-.0471)}{(.0140)(5)}$ = .30 not .03

Therefore, TPM (Dry) = 5.8 - .30 - .53 = 5.0 not 5.2

13. Water Calculation: $\frac{(1467 \div 5605) + (-.0591)}{(.0152)(5)}$ = 2.67 not 3.06

Therefore, TPM (Dry) = 27.4 - 2.67 - 1.57 = 23.2 not 22.8

14. Nicotine Calculation: $\frac{1.059\ (.664 - \frac{1}{2}\ (.268 + .140))500}{(34.3)(5)}$ = 1.42 not 1.48

15. TPM (Dry) Calculation: = 10.3 - .40 - .82 = 9.1 not 9.5

16. TPM (Dry) Calculation: 5.0 - .41 - .44 = 4.2 not 3.4

17. TPM (Dry) Calculation: 17.2 - .76 - 1.17 = 15.3 not 16.0

18. TPM (Dry) Calculation: 11.6 - .66 - .71 = 10.2 not 9.5

19. TPM (Dry) Calculation: 7.6 - .71 - .59 = 6.3 not 5.9

20. TPM (Dry) Calculation: 18.8 - 3.18 - .97 = 14.7 not 15.0

21. TPM (Dry) Calculation: 11.9 - .41 - .75 = 10.7 not 9.8

22. Water Calculation: $\frac{(331 \div 7601) + (-.0500)}{(.0150)(5)}$ = -.09 not -.61

Therefore, TPM (Dry) = 1.1 - (-.09) - .16 = 1.0 not 1.6

23. TPM (Wet) Calculation: $\frac{(33.2660 - 33.1593) \times 1000}{5}$ = 21.3 not 21.9

Therefore, TPM (Dry) = 21.3 - 3.60 - 1.28 = 16.4 not 17.0

24. Water Calculation: $\frac{(1433 \div 5019) + (-.0473)}{(.0149)(5)}$ = 3.20 not 3.60

Therefore, TPM (Dry) = 20.1 - 3.20 - 1.17 = 15.7 not 15.3

25. Water Calculation: $\frac{(1471 \div 5094) + (-.0490)}{(.0174)(5)}$ = 2.76 not 3.26

Therefore, TPM (Dry) = 21.0 - 2.76 - 1.25 = 17.0 not 16.5

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix II

Federal Trade Commission

TPM (Dry), Nicotine and Carbon Monoxide Measurements

Data Dated December 1981

Posting Errors

Date	Cigarette No.	Run	Port	TPM (Dry) Posted As	TPM (Dry) Should Be	Nicotine Posted As	Nicotine Should Be	Carbon Monoxide Posted As	Carbon Monoxide Should Be
Posting Errors to Summary Sheets									
7/23/81	17M	5	12					16.3	16.5
7/29/81	17M	4	16					17.7	17.3
8/18/81	17M	3	1	*	16.3	*	1.28	*	18.6
8/18/81	17M	1	14					17.1	17.5
8/18/81	17M	1	5	17.3	17.0				
8/31/81	17M	3	2					18.2	18.0
9/02/81	17M	3	8					16.8	16.3
9/03/81	17M	4	16					19.9	16.9
9/09/81	17M	4	12	14.2	14.4				
9/09/81	17M	1	11			1.27	1.21		
9/21/81	17M	4	17	16.5	14.8			16.5	17.2
10/28/81	C	2	4					5.8	4.9

*Not posted to summary sheet.

Posting Errors from Computer Printout									
7/07/81	100	4	14					18.5	18.8
7/14/81	96	2	17					16.7	16.9
7/31/81	75	3	8					13.6	13.9
9/09/81	111	4	15					11.2	11.4
9/11/81	95	3	10					16.8	11.2
9/11/81	17M	3	9					14.7	16.8

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix III

Federal Trade Commission

TPM (Dry), Nicotine and Carbon Monoxide Determinations

Data Dated December 1981

Impossible Figures

Date	Cigarette No.	Run	Port	Reason
6/24/81	#117	2	15	TPM (Dry) = -.16
7/01/81	# 23	2	17	TPM (Dry) = -.5
7/02/81	# 22	2	2	TPM (Dry) = -.03
7/02/81	# 32	2	8	TPM (Dry) = -.03
7/02/81	# 7	2	19	TPM (Dry) = -.12
7/06/81	#120	2	20	TPM (Dry) = -.4
7/06/81	# 22	5	13	TPM (Dry) = -.15
7/07/81	#165	3	19	TPM (Dry) = -.19
7/08/81	# 30	1	6	TPM (Dry) = -.07
7/13/81	# 22	1	4	TPM (Dry) = -1.2
7/13/81	# 32	3	4	TPM (Dry) = -.4
7/14/81	# 30	1	20	TPM (Dry) = -.4
7/14/81	# 23	2	20	TPM (Dry) = -.25
7/14/81	#120	5	13	TPM (Wet) = -.3 & TPM (Dry) = -.95
7/15/81	#117	2	5	TPM (Wet) = -.1 & TPM (Dry) = -.3
7/15/81	# 22	4	6	TPM (Wet) = -.4 & TPM (Dry) = -.9
7/15/81	#117	4	14	TPM (Wet) = -.08 & TPM (Dry) = -1.2
7/16/81	# 7	3	8	TPM (Dry) = -.02
7/16/81	#120	3	10	TPM (Wet) = -.38 & TPM (Dry) = -.5
7/20/81	# 11	3	3	TPM (Dry) = -.25

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix III - (Con't)

Date	Cigarette No.	Run	Port	Reason
7/21/81	# 23	1	7	TPM (Dry) = -.3
7/21/81	# 30	1	9	TPM (Wet) = -.3 & TPM (Dry) = -.79
7/21/81	# 30	2	11	TPM (Wet) = -.4 & TPM (Dry) = -1.0
7/21/81	#165	3	3	TPM (Dry) = -.06
7/21/81	#120	3	19	TPM (Wet) = -.3 & TPM (Dry) = -1.19
7/21/81	# 22	4	15	TPM (Wet) = -.38 & TPM (Dry) = -.6
7/21/81	#117	5	20	TPM (Wet) = -.3 & TPM (Dry) = -.86
7/23/81	#174	2	12	TPM (Dry) = -.2
7/24/81	# 30	2	12	TPM (Wet) = -.4 & TPM (Dry) = -.6
7/24/81	#117	3	2	TPM (Dry) = -.27
7/24/81	#120	3	14	TPM (Wet) = -.3 & TPM (Dry) = -.77
7/28/81	#120	3	15	TPM (Wet) = -.36 & TPM (Dry) = -1.4
7/28/81	# 22	5	9	TPM (Wet) = -.3 & TPM (Dry) - -.5
7/30/81	#117	4	7	TPM (Wet) = -.16 & TPM (Dry) = -.27
7/30/81	# 30	1	19	TPM (Wet) = -.3 & TPM (Dry) = -.4
7/31/81	# 30	5	13	TPM (Wet) = -.28 & TPM(Dry) = -.39
7/31/81	# 22	4	14	TPM (Wet) = -.3 & TPM (Dry) = -.38
7/31/81	#117	2	10	TPM (Wet) = -.2 & TPM (Dry) = -1.1
8/03/81	# 31	2	5	TPM (Dry) = -.17
8/03/81	#120	1	9	TPM (Wet) = -.48 & TPM (Dry) = -.8
8/05/81	# 30	4	10	TPM (Wet) = -.2 & TPM (Dry) = -.5
8/05/81	# 33	2	10	TPM (Dry) = -.1
8/06/81	#120	2	1	TPM (Wet) = -.2 & TPM (Dry) = -.3
8/07/81	# 30	4	17	TPM (Wet) = -.2 & TPM (Dry) = -.67

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix III - (Con't)

Date	Cigarette No.	Run	Port	Reason
8/07/81	# 33	4	6	TPM (Dry) = -.2
8/10/81	# 22	5	10	TPM (Wet) = -.3 & TPM (Dry) = -.68
8/10/81	#117	3	18	TPM (Dry) = -.04
8/11/81	#120	3	8	TPM (Wet) = -.18 & TPM (Dry) = -.3
8/12/81	#120	3	6	TPM (Wet) = -.2 & TPM (Dry) = -.89
8/12/81	# 32	2	15	TPM (Dry) = -.86
8/12/81	# 30	2	2	TPM (Wet) = -.28 & TPM (Dry) = -1.25
8/13/81	# 22	4	12	TPM (Wet) = -.4 & TPM (Dry) = -.8
8/13/81	#174	2	9	TPM (Dry) = -.1
8/17/81	# 7	4	15	TPM (Dry) = -.75
8/17/81	#120	3	16	TPM (Wet) = -.3 & TPM (Dry) = -.16
8/17/81	# 33	3	1	TPM (Dry) = -.08
8/18/81	#165	3	10	TPM (Dry) = -.37
8/18/81	# 31	2	11	TPM (Dry) = -.28
8/19/81	# 22	5	16	TPM (Dry) = -.18
8/19/81	#117	5	4	TPM (Dry) = -.09
8/19/81	# 30	4	8	TPM (Wet) = -.28 & TPM (Dry) = -.36
8/21/81	#120	3	17	TPM (Wet) = -.16 (note: H_2O = -.249)
8/21/81	#117	3	12	TPM (Wet) = -.06 & TPM (Dry) = -.1
8/24/81	# 30	5	3	TPM (Wet) = -.3 & TPM (Dry) = -.5
8/24/81	# 22	3	18	TPM (Wet) = -.4 & TPM (Dry) = -.5
8/24/81	# 30	1	5	TPM (Wet) = -.3 & TPM (Dry) = -.4
8/25/81	#120	3	3	TPM (Wet) = -.2 & TPM (Dry) = -.18

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix III - (Con't)

Date	Cigarette No.	Run	Port	Reason
8/25/81	#117	2	13	TPM (Wet) = -.2 & TPM (Dry) = -.28
8/26/81	# 32	3	5	TPM (Dry) = -.09
8/26/81	# 22	1	19	TPM (Wet) = -.36 & TPM (Dry) = -.49
8/28/81	#174	4	18	TPM (Dry) = -.5
8/28/81	# 7	2	7	TPM (Dry) = -.8
8/28/81	#117	1	16	TPM (Wet) = -.28 & TPM (Dry) = -.46
8/31/81	# 22	5	20	TPM (Wet) = -.38 & TPM (Dry) = -.3
8/31/81	#120	5	5	TPM (Wet) = -.36 & TPM (Dry) = -.2
8/31/81	# 30	1	4	TPM (Wet) = -.26 & TPM (Dry) = -.2
9/01/81	# 32	1	3	TPM (Dry) = -.6
9/02/81	#120	4	7	TPM (Wet) = -.18 & TPM(Dry) = -.8
9/02/81	# 33	3	7	TPM (Dry) = -.03
9/03/81	# 30	3	1	TPM (Wet) = -.3 & TPM (Dry) = -.26
9/03/81	# 30	2	14	TPM (Wet) = -.3 & TPM (Dry) = -.8
9/03/81	#117	1	6	TPM (Wet) = -.1 (note: H_2O = -.17)
9/04/81	# 22	2	11	TPM (Wet) = -.36 & TPM (Dry) = -.48
9/08/81	#120	1	18	TPM (Wet) = -.3 & TPM (Dry) = -.18
9/09/81	# 30	5	18	TPM (Wet) = -.3 (note; H_2O = -.415)
9/09/81	# 22	2	17	TPM (Wet) = -.36 & TPM (Dry) = -.08
9/09/81	#120	2	2	TPM (Wet) = -.3 & TPM (Dry) = -.8
9/09/81	# 32	1	20	TPM (Dry) = -.26
9/11/81	# 22	5	8	TPM (Wet) = -.3 & TPM (Dry) = -.48
9/14/81	# 6	4	9	TPM (Dry) = -.1
9/14/81	# 32	3	19	TPM (Dry) = -.06

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix III - (Con't)

Date	Cigarette No.	Run	Port	Reason
9/14/81	#117	2	9	TPM (Wet) = -.2 & TPM (Dry) = -.6
9/14/81	# 32	1	6	TPM (Dry) = -.3
9/15/81	#117	5	19	TPM (Wet) = -.38 (note: H_2O = -.37)
9/15/81	# 30	1	15	TPM (Wet) = -.3 (note: H_2O = -.377)
9/16/81	# 11	3	12	TPM (Dry) = -.3
9/17/81	#117	5	1	TPM (Dry) = -1.7
9/17/81	# 30	4	7	TPM (Wet) = -.26 & TPM (Dry) = -.29
9/17/81	#120	1	4	TPM (Wet) = -.3 (note: H_2O = -1.095)
9/18/81	# 22	2	3	TPM (Wet) = -.2 & TPM (Dry) = -.7
9/21/81	# 22	4	1	TPM (Wet) = -.1 & TPM (Dry) = -.5
10/28/81	A	4	4	TPM (Dry) = -.67
10/28/81	A	3	11	TPM (Dry) = -1.6
10/28/81	A	3	15	TPM (Dry) = -.4
10/28/81	A	3	7	TPM (Dry) = -.08
10/28/81	A	2	10	TPM (Dry) = -.17
10/28/81	A	1	1	TPM (Dry) = -.05

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001

Appendix IV

Federal Trade Commission

Tar, Nicotine and Carbon Monoxide Determinations

Rounding Errors

Brands	Average TPM (Dry) FTC Report	Summary Sheet
Barclay 100's f sp 100mm	2.2	2.145
Benson & Hedges Lights 100's f hp 100mm	11.0	10.355
Newport k f sp m 85mm	17.5	17.445
Parliament Lights 100's f sp 100mm	11.8	11.745
Salem k f sp m 85mm	14.1	14.045
Silva Thins 100's f sp m 100mm	11.1	11.047
Tareyton k f sp 85mm	14.2	14.145
Triumph k f sp 85mm	2.7	2.645
Virginia Slims 100's f sp 100mm	15.1	15.047

Brands	Average Nicotine FTC Report	Summary Sheet
Tareyton Lights k f sp 85mm	.43	.4245
Viceroy Rich Lights 100's f sp 100mm	.77	.7645

Brands	Average Carbon Monoxide FTC Report	Summary Sheet
Benson & Hedges Lights 100's f hp 100mm	11.3	11.245
Chesterfield 101 f sp 101mm	16.3	16.245
Decade k f sp 85mm	4.4	4.345
Doral II k f sp m 85mm	3.5	3.447
Eve Lights 120's f hp m 120mm	12.3	12.245
Lark 100's f sp 100mm	15.0	14.945
Marlboro Lights k f hp 85mm	11.9	11.845
Salem Lights k f sp m 85mm	9.6	9.547
Silva Thins 100's f sp m 100mm	9.2	9.147

Source: https://www.industrydocuments.ucsf.edu/docs/zgkk0001